

MEMORANDUM

June 29, 1990

TO: H. A. Caves, Chief
Consumer Protection Service

FROM: Paul H. Brown, Director *PHB*
Radiation Protection Division

SUBJECT: Radiation Survey of Sooner Dial

On April 24, 1990, Gary Ammon and I traveled to Clinton for the purpose of conducting a radiation survey of the building, land, and rubble which was associated with the Sooner Dial Facility. The present land owner, Ron Grubb, was contacted (405-323-6400), and we received his permission to survey the site. We were also assisted by our local sanitarian, Terry Thiesson.

Areas surveyed were the original site, which consists of a vacant lot and auto shop located at 1000-1004 10th Street, the adjacent alley, and surrounding property (see attached map). In addition, building rubble had been removed and transported to a dumping area approximately two (2) miles southeast of the site. This dump area is an isolated field in which fill material had been requested. No further development of this area is now planned.

A radiation survey was performed at all locations utilizing a Ludlum Micro-R Meter. Gamma readings in excess of 50 micro-R per hour (approximately 7 to 8 times background) were noted and those areas delineated on the map. In addition, soil samples were taken for further analysis. Sample numbers and locations are also noted on the accompanying map.

Procedure for Analyzing Soil Samples

The radium-226 in soil samples were analyzed by Mark Kurklin of the radiochemistry laboratory in June 1990. They were first air dried and then crushed to a granular consistency. (They were not ground with a mortar and pestle.) Each sample was mixed well and a 25 gram aliquot of the soil was weighed into a plastic bottle that was used as the configuration for calibration. A known radium-226 standard was prepared using 25 grams of low background soil in the same plastic bottle configuration.

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<u>Sample Location</u>	<u>Gamma Reading</u> <i>of Background</i>	<u>Soil Depth</u>	<u>Activity/Gram</u>
4	1000 Micro R	0 - 6 In	571
5	1000 Micro R	6 - 12 In	1003
6	50 Micro R	0 - 4 In	83
7	50 Micro R	0 - 6 In	71
8	50 Micro R	6 - 12 In	1002
9	50 Micro R	0 - 6 In	176
10	50 Micro R	6 - 12 In	102
11	100 Micro R	0 - 6 In	121
12	100 Micro R	0 - 6 In	31
13	250 Micro R	0 - 6 In	412

Samples 7 and 8 were taken on property, uphill from the site. I would speculate that this area contains fill dirt, which was removed from the original site.

Observations

It is evident from this and previous surveys that there is radium contamination present on the site at levels which may require removal. This information was conveyed to Mr. Grubb, who I visited with as the survey was being completed.

Of particular concern is that the access to the vacant lot is unrestricted. A \$75 fence was placed around the lot in 1985, but removed shortly after to allow for mowing.

The fact that there is soil contamination off-site on will also be of concern.

Recommendations

A thorough site characterization study is needed which is beyond our capabilities. This is something that should be requested of Mr. Grubb.

We should rely on Terry Thiesson of the Custer County Health Department to monitor the area and report any changes. We also need to keep him fully informed.

The contamination area located on adjacent property will be of concern. I have no suggestions for its remediation.

Finally, we must begin to reach some agreement within the agency as to what our policies and protocols should be for management and clean-up of this site.

PHB/mj

Attachment 1

cc: Sooner Dial File

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A gamma spectrum of each sample, the standard, and a blank was collected for 30 minutes on a Canberra Series 90 Multichannel Analyzer. The area under the radium-226, 186.1 KeV energy peak was determined using the gamma spectrum analysis computer software provided by Canberra Industries. The radio-activity due to radium-226 in each of the samples was calculated as proportional to the number of counts under the 186.1 KeV energy peak of the known standard. There was no apparent interference from uranium-235 which has a gamma peak at 185.7 KeV.

Regulatory Limits

Section 14, Table 3, Column 2 of the Oklahoma Radiation Protection Regulations indicates a release limit for insoluble Ra-226 in water as 3×10^{-5} microCuries/ml (30 pico Curie/ml). No specific table exists for soil contamination. However, it is an acceptable practice to convert this table to soil contamination limits by substituting the pCi/ml to pCi/gram. Therefore, the soil contamination limit should be 30 pCi/gram. (Further rationale to support this assumption can be obtained from Dale McHard).

The survey results and observations for each locale follow:

Dump Site

Again, this is a very isolated area containing numerous piles of building rubble. Gamma surveys were conducted, and three areas with elevated readings were staked, and soil samples collected. The results follow:

<u>Area</u>	<u>Gamma Reading</u>	<u>Soil Depth</u>	<u>Activity/gram</u>
1	350 Micro R/hr	0 - 6 In	385 pCi
2	250 Micro R/hr	0 - 6 In	18 pCi
3	200 Micro R/hr	0 - 6 In	226 pCi

This area does contain building rubble with residual radium in concentrations of concern. Due to its isolated location, at this time I would not recommend any removal. However, the area must be observed for any future development plans.

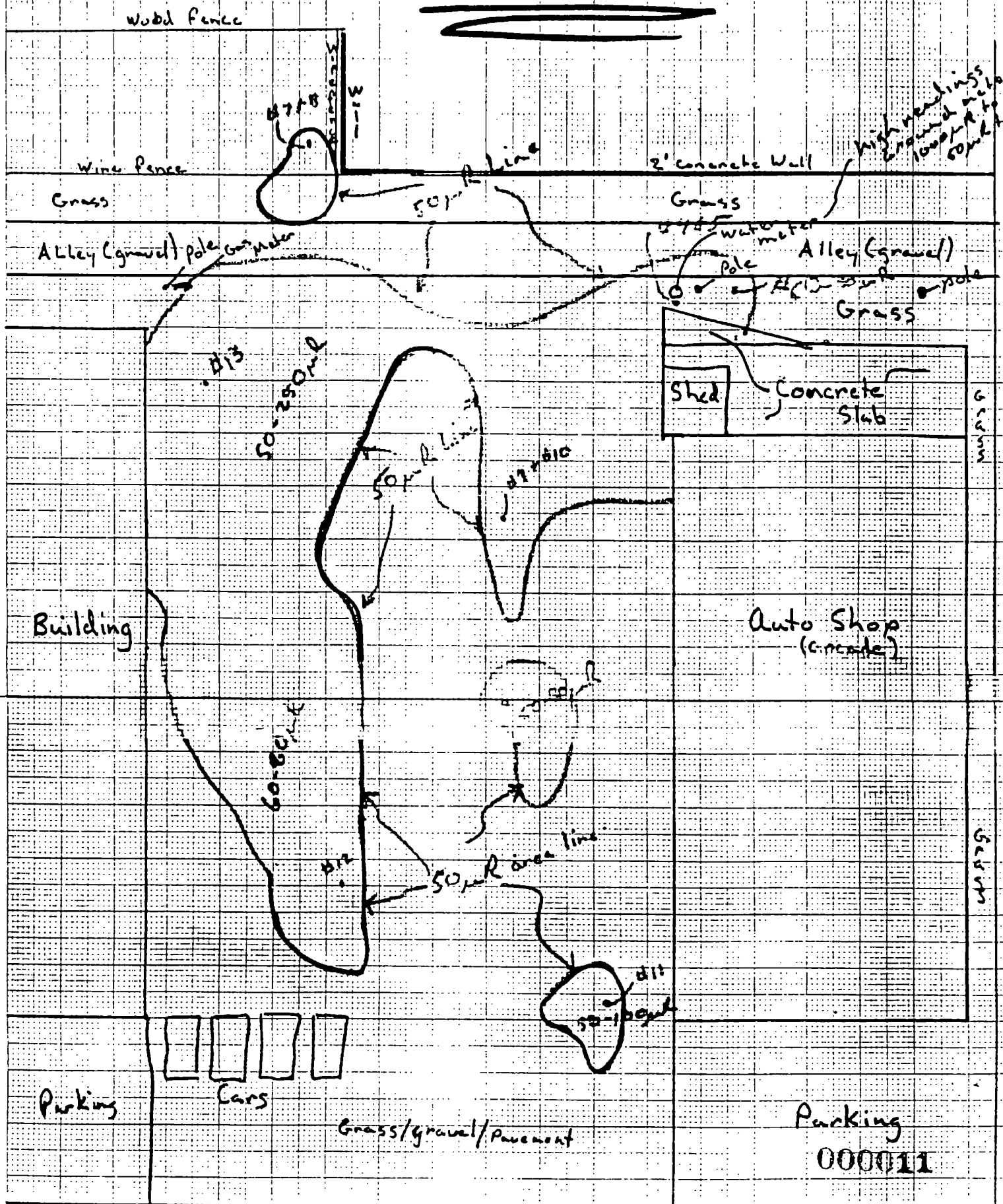
Auto Shop

Gamma surveys indicated three areas on the floor with measurable readings. However, these areas had been painted and marked. Swipe tests indicated no removal contamination. I consider the floor to be acceptable and no further remedial action is needed.

Vacant Lot

A building formerly located at the rear of the auto body shop had been removed in late 1984, and the rubble transported to the dump area previously mentioned. There appears to be concrete in areas of the lot 4 - 6 inches below the surface. The following sample locations (noted on the map) and readings are associated with this lot and the adjacent areas:

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[illegible]

SCALE: 1 in = 1 ft

Joan K. Leavitt, M.D.
Commissioner

OKLAHOMA STATE
DEPARTMENT OF HEALTH
R.O. BOX 53551
1000 NE TENTH
OKLAHOMA CITY, OK 73152



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Work Plan for Sooner Dial Company Site
Clinton, Oklahoma

INTRODUCTION

In brief summary, this site, near downtown Clinton, is the former location of an aircraft instrument refinishing operation which operated under the name of Sooner Dial Company. In the process of refurbishing these instruments, a mixture of radium and a paint containing a phosphor activated by the alpha particles emitted by the radium was applied to the instrument dials. The process of removing the old radium/paint mixture and the application of new paint created substantial amounts of radium-contaminated waste. Some of the waste was in the form of a slurry while some was in the form of very small pieces of metal or hardened paint. Generally, the handling, storage, and disposal of such waste usually did not even approach the measures which would be taken today in a similar situation.

Thus, it is not surprising to find significant radium contamination at this site as a result of the operations carried out there in the past by Sooner Dial Company.

Purpose of this Plan

1. To describe in some detail a plan for determining the scope and extent of the radium contamination at this site and any which exists in adjoining or nearby areas.
2. To the extent that decontamination activities may occur in conjunction with site assessment, to describe in general terms the activities which will (or may) be necessary in order to decontaminate the site to a level suitable for unrestricted use.

Site Assessment Plan

1. Establish a grid system with 5-meter-square grids over the entire Sooner Dial site exclusive of the auto shop building on the north side of the site. The grid system should cover the easements, the alley, and any other publicly-owned strips of land abutting the site. The grid system should be marked with stakes or flags or in some other appropriate fashion; the grid should be displayed on a scale drawing of the site as well.

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2. Using the grid system as a guide, survey and record the gamma radiation levels at the surface and at a height of 1 meter above the surface at each corner established by the grid. Isopleths of the gamma levels found should be created on the scale drawing of the site.
3. For those locations exceeding a pre-determined level - 5 times background, for example - additional, more detailed surveys should be conducted, and the data collected recorded for use in the assessment.
4. Core samples from holes at selected locations, based on the data from #2 and 3 above, should be collected and analyzed for radium content. Coring should be to a minimum depth of 6 feet with each 6-inch segment analyzed separately. If the initial core samples indicate extensive radium contamination of soil more than 6 inches below the surface, additional coring should be considered for the purpose of more accurately assessing the site.
5. Using some written protocol which assures completeness of the survey, the buildings and concrete slab on the north side of the site should be surveyed.
6. To the extent to which owners' permission can be obtained, survey the private property immediately to the west of the alley behind the site and the building immediately south of the site and any open ground or parking lots associated with this building. These surveys should be conducted in a manner consistent with the procedures adopted for use in #1, 2, 3, and 5 above.
7. Without intruding on private property, survey the neighborhood of the site at a radius of about 2 - 3 city blocks in all directions. The survey locations should be selected to be representative of the area being surveyed; these locations should be described and recorded for future reference.
8. For the "south" site (a lot about 2 miles south of the Sooner Dial site to which building material debris from the Sooner Dial site had been taken several years ago), a gamma survey of sufficient detail should be conducted to determine any areas where the gamma level at 1 meter above the surface exceeds a pre-determined value. Any such areas identified should be plotted on a scale drawing of the south site. If preliminary surveys indicate extensive contamination due to Sooner Dial site debris, further surveys should be done, and soil samples from appropriate areas should be taken for analyses.
9. Based on the data collected as a result of the activities described in items #1 through 8 and in consideration of decontamination guidelines for radium, a site assessment document should be prepared which contains the following information:

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- a. projected length of time to complete decontamination and clean-up activities;
- b. unusual contingencies which do or may exist which would affect decontamination and clean-up activities;
- c. estimated resource requirements in terms of personnel, tools, radiation detection equipment, radiochemistry laboratory services, heavy equipment such as trucks, expendable supplies, and waste disposal services for waste removed from the site; and
- d. estimated costs associated with the decontamination and clean-up.

Decontamination/Clean-up Activities

- 10. Based on the information known at this time, and with consideration of good health physics practice in regard to radium contamination, the following activities are expected to occur as a result of efforts to decontaminate and clean-up so that the Sooner Dial site and, as necessary, the south site are left in a finished state for unrestricted release:
 - a. extensive moving, excavation, or disturbance of surface and sub-surface soil;
 - b. categorization of radium contamination in disturbed soil based on either field surveys for gamma or laboratory analyses or both;
 - c. separation of the categorized soils into piles or distinct areas;
 - d. excavation of buried radium-rich shop waste, if present, and packaging of such waste into suitable containers;
 - e. packaging of highly-contaminated soil into suitable containers and shipment of this waste as well as that mentioned in 10(d) and 10(h) to a low-level radioactive waste (LLW) broker or direct to a LLW disposal site;
 - f. replacement of slightly-to-moderately contaminated soil on the site, preferably in a fashion so that it is no longer at the surface;
 - g. acquisition and placement of fresh, non-contaminated soil on the site surface to restore site topography and to facilitate seeding with grass or other vegetation;
 - h. removal of any radium found to be above guidelines on building structures such as floors or walls;

- i. necessary activities to respond to inquiries from local residents or from the news media;
- j. those routine health physics activities necessary to provide proper personnel protection to workers and to assure the safety of the general public, especially passers-by and neighborhood residents; and
- k. any activities arising from the need to cope with any unanticipated or extraordinary occurrence during this clean-up process.

Equipment and Services

11. The grid system should be established using recognized land surveyor methods.
12. The radiation detection equipment necessary to accomplish the activities mentioned in #2, 3, 5, 6, 7, 8, 10(b), 10(h), 10(j), and 10(k) must be of the type normally referred to as "micro-R meters" and capable of measuring gamma radiation at levels ranging from 1 micro-Roentgen per hour ($\mu\text{R/hr}$) to several thousand $\mu\text{R/hr}$. The normal gamma background in Clinton, but not on the site, is about 8 $\mu\text{R/hr}$ as determined by such an instrument.
13. In addition, portable radiation detection instruments capable of detecting gamma, beta, and alpha radiation must be available for use at the site. Activities mentioned in #5, 6, and 10(j) are likely uses of such instrumentation.
14. Personal and area air samplers and dosimeters will be required to meet the scope of 10(j).
15. Other personal protective equipment which may be required include respirators, goggles, gloves, hard hats, and work shoes or boots.
16. The radiochemistry laboratory used must be able to analyze soil samples for radium (reported in units of picoCuries per gram, dry weight) using procedures which allow for consistency in counting geometry and detector efficiency. The laboratory must be capable of conducting gross alpha/gross beta and/or radium analyses on materials deposited on paper

Work Plan for Sooner Dial Company Site
Clinton, Oklahoma
Page Five

filters, reported in units of net counts per minute with a counting efficiency factor or in disintegrations per minute. The laboratory should have the capacity of performing analyses for gross alpha, gross beta, or radium on samples of differing media.

Prepared by:

Dale McHard, Chief Environmental Engineer
Radiation Protection Division

DMc/mj

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August 23, 1990

Mr. Ron Grubb
Neptune Drive, So. of City
Clinton, Oklahoma 73601

Dear Mr. Grubb:

The Oklahoma State Department of Health ("Department") has reason to believe that your unimproved property at 1000 South 10th Street in Clinton, as is, is a potential threat to the public health as a radiation hazard. This belief is based upon the results of preliminary site surveys conducted most recently on April 24, 1990 and prior to that on April 15, 1986, July 1, February 11 and on January 24, 1985. In each instance low-level ionizing radiation was detected at levels that could with reasonable expectation result in harmful radiation exposure if ingested or inhaled under certain circumstances.

The Department has identified several avenues to address the investigation and remediation of this site to reduce the potential radiation hazard which it presently poses.

The preferred option is that you voluntarily agree to conduct a detailed site characterization of your property to assess the extent and severity of the uncontrolled radium contaminated soil, with subsequent removal to the extent necessary. Attached are proposed criteria for the detailed characterization of the property. Both the final work plan and the timetable for the completion of events are subject to prior approval by the state before implementation. The Department requests that you send a written response expressing your intentions within 15 days of your receipt of this letter. Your agreement to pursue an approved course of action for the investigation and remediation of this site will render enforcement action by the State unnecessary.

Upon receipt of a negative response or a refusal to elect to investigate/remediate the potentially hazardous site owned by you, the State may pursue enforcement action for the abatement of a public nuisance and/or for violations of the Department of Health Radiation Protection Regulations. Such action could result in the assessment of fines and/or costs charged as a lien upon the property.

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In pursuing alternatives, the Department has also made inquiry to the EPA Region VI office for determining whether the site can be characterized as a hazardous waste site under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). Should the EPA qualify the site for investigation and remediation, sections 104 and 107 of CERCLA allow the EPA to identify potentially responsible parties (PRP's) to pay the total cleanup cost incurred by the government except where the responsible party will take proper action for the release. Should a responsible party refuse to take proper action, the EPA may then initiate a section 104 cleanup unhindered by immediate judicial review until the EPA seeks to recover its costs in a suit brought under section 107.

Should you elect to pursue investigation and remediation of the site, the Department could provide you with a list of several qualified contractors that perform this type of work, but the Department would not be able to endorse a particular contractor. Should you have questions or wish to discuss this matter the appropriate contact persons are Jimmy D. Givens at 271-7363 for legal questions and Dale McHard at 271-5221 for technical questions. Again, the Department requests that you respond with your intentions regarding this matter within 15 days or it may be the subject of State enforcement action or referral to the EPA.

Sincerely,

Jimmy D. Givens,
Enforcement Attorney

JG/dh

Enclosures

cc: H.A. Caves, Consumer Protection Service Chief
Stephen Coil, Custer County D.A.
Dan Galloway, Clinton City Manager
Bill Kemp, Radiation Protection Division
Dale McHard, Radiation Protection Division
Randy Meacham, Clinton City Attorney
Nick Slaymaker, Enforcement Assistant
Terry Thiessen, Custer County Sanitarian
Scott Thompson, Solid Waste Division
David Wattenbarger, Regional County Health Administrator

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August 24, 1990

Oklahoma Bank and Trust Company
Box 99
Clinton, Oklahoma 73601

To Whom It May Concern:

The Oklahoma State Department of Health ("Department") has reason to believe that the unimproved part of your property at 1401 Industrial Road in Clinton, as is, is a potential threat to the public health as a radiation hazard. This belief is based upon the results of preliminary site surveys conducted most recently on April 24, 1990 and prior to that on April 15, 1986, and on January 24, 1985. In each instance low-level ionizing radiation was detected at levels that could with reasonable expectation result in harmful radiation exposure if ingested or inhaled under certain circumstances.

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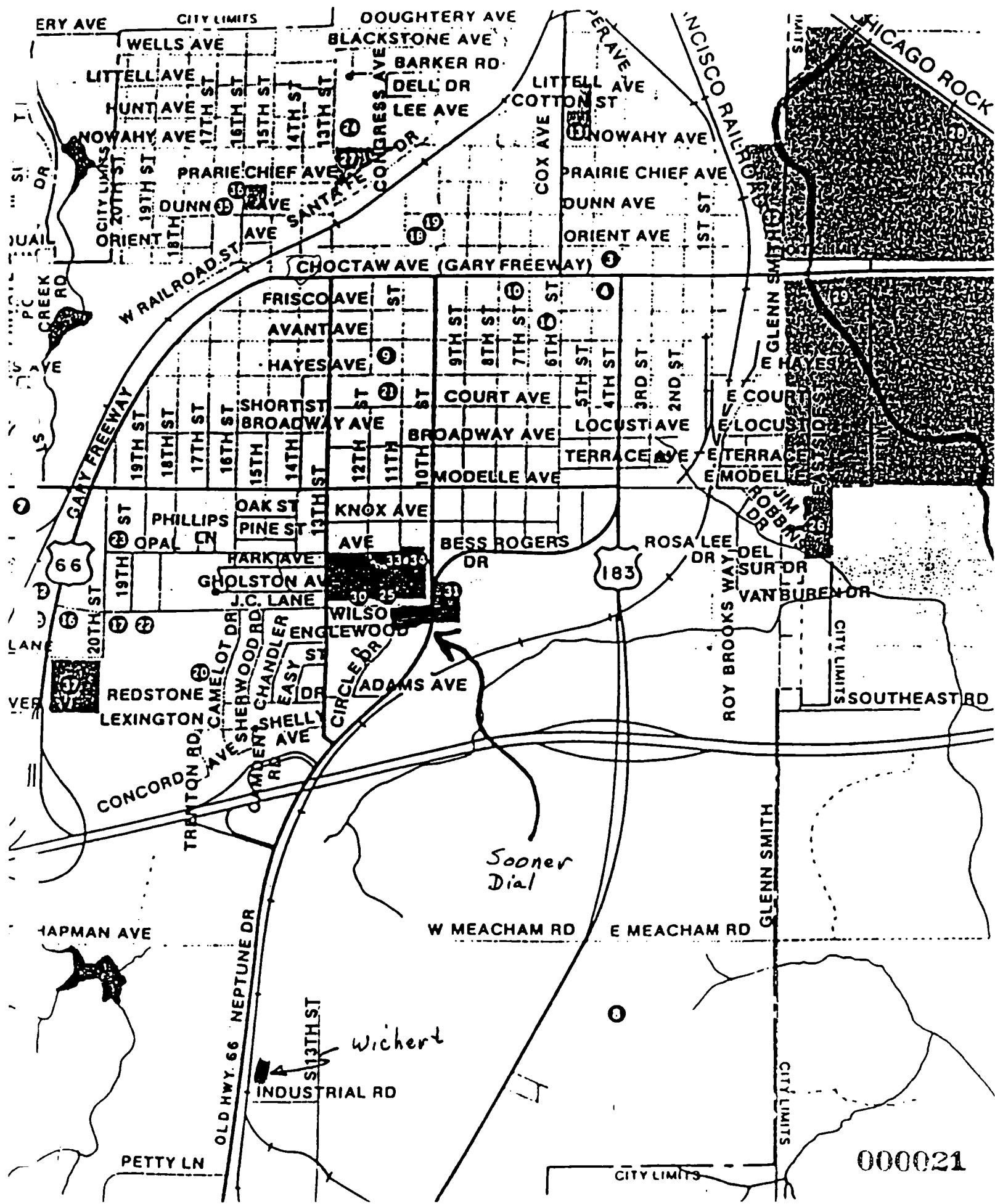
Jimmy D. Givens,
Enforcement Attorney

JG/dh

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